Growth and P Uptake of *Dactylis glomerata* L . and *Anthoxanthum odoratum* L . Response to Mycorrhizal Inoculation in Acid Condition

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Growth and P uptake of *Dactylis glomerata* L. and *Anthoxanthum odoratum* L. response to mycorrhizal inoculation in acid condition

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Introduction We found the AMF colonization of *A. odoratum* not correlated with soil pH, and coverage of *A. odoratum* strongly correlated with AMF colonization in our field study (Wu et al. 2006). In addition, we also found the mycorrhizal colonization, total spore number in rhizosphere of *A. odoratum* prominently higher than that of the *D. glomerata*, respectively. The spore density of *A. odoratum* and *D. glomerata* were of 15 and 4 spores per 10g fresh soil, respectively. Four different morphological types of spores occurred in rhizosphere of *A. odoratum* and only one morphological type of spore occurred in rhizosphere of *D. glomerata*. These results suggest that the *A. odoratum* invade and extend in severity acidic pasture origin of this specificity on arbuscular mycorrhizal symbiosis in acidic soil other than *D. glomerata*. In present study, we explored the effect of soil pH in mycorrhizal colonization, P uptake and growth of both plants by glasshouse experiment.

Materials and methods Plant materials: *D. glomerata*, is grass; *A. odoratum*, is weed. Treatment and soil modulate: all experiment include 2 (soil sterilized and non sterilized) x 4 (pH=3, 4 (control), 5, 6)=8 treatments. Cultivating soil collected from an acidic artificial pasture (pH=4), soil sterilized by benomyl (Fitter and Nichols 1988), soil pH modulated by NaOH. Planting and harvest: 4 seedlings of *D. glomerata* and *A. odoratum* mixed planting to per pot respectively at 2 Jun 2003, all treatment harvested at 2 September 2003. Measures: The roots were stained with trypan blue / lactic acid and the mycorrhizal colonization (percentage of root infected by arbuscular mycorrhizal fungi) was calculated using the line-intersect method (Giovannettti and Mosse 1980). Shoot biomass and P content measured after drying at 70℃ with 48h. Experiment conducted in farm of college of Agricultural Science of Tohoku University, Osaki, Miyagi prefecture, Japan (38°45′N, 140°45′E).

Results Significantly positive correlation occurred in soil pH between Mycorrhizal colonization of *D. glomerata*, but the *A. odoratum* was not yet. A significantly positive correlation occurred in mycorrhizal colonization between shoot dry mass of both plants. Also a significantly positive correlation occurred in mycorrhizal colonization between shoot P content of both plants (Table 1).

Table 1 *Regression equations of some parameters of* D. glomerata *and* A. odoratum.

Plants	regression equations		
D. glomerata	$y_1=10.07x_1-24.70$, $r=0.894$, $p<0.0001$	$y_2=0.01x_2+0.23$, $r=0.867$, $p=0.0003$	$y_3=0.04x_2+2.32$, $r=0.748$, $p=0.005$
A. odoratum	$y_1=1.80x_1+20.05$, $r=0.243$, $p=0.446$	$y_2=0.01x_2+0.21$, $r=0.778$, $p=0.0029$	$y_3=0.07x_3+1.61$, $r=0.797$, $p=0.002$

y_1 Mycorrhizal colonization, x_1 soil pH, y_2 shoot dry mass, x_2 Mycorrhizal colonization, y_3 shoot P content, x_3 Mycorrhizal colonization.

Conclusions Based on these results, we concluded that the *A. odoratum* have a specific mycorrhizal symbiosis in acid soil condition. Mycorrhizal colonization of *D. glomerata* strongly affected by soil pH, but the *A. odoratum* was not yet, mycorrhizal colonization of *D. glomerata* significantly decreased by declined the soil pH, result to decrease the nutrient uptake, growth, acidity tolerance and competition ability of *D. glomerata*, conduced its declined. On the contrary, mycorrhizal colonization of *A. odoratum* not decreased by declined the soil pH, the mycorrhizal symbiosis led to a positive effect on nutrient uptake, growth, acid tolerance and competition ability of *A. odoratum*. Consider to *A. odoratum* invade and extend in severity acidic artificial pasture origin of this specificity on arbuscular mycorrhizal symbiosis in acidic soil other than *D. glomerata*. Our results have a important meaning and value reference on understand to mechanism of invade and extend in severity acidic artificial pasture by *A. odoratum* and declined of *D. glomerata* in same condition.

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